Texas Highway Department
District No. 18
DALLAS, TEXAS
JAN 8 1959
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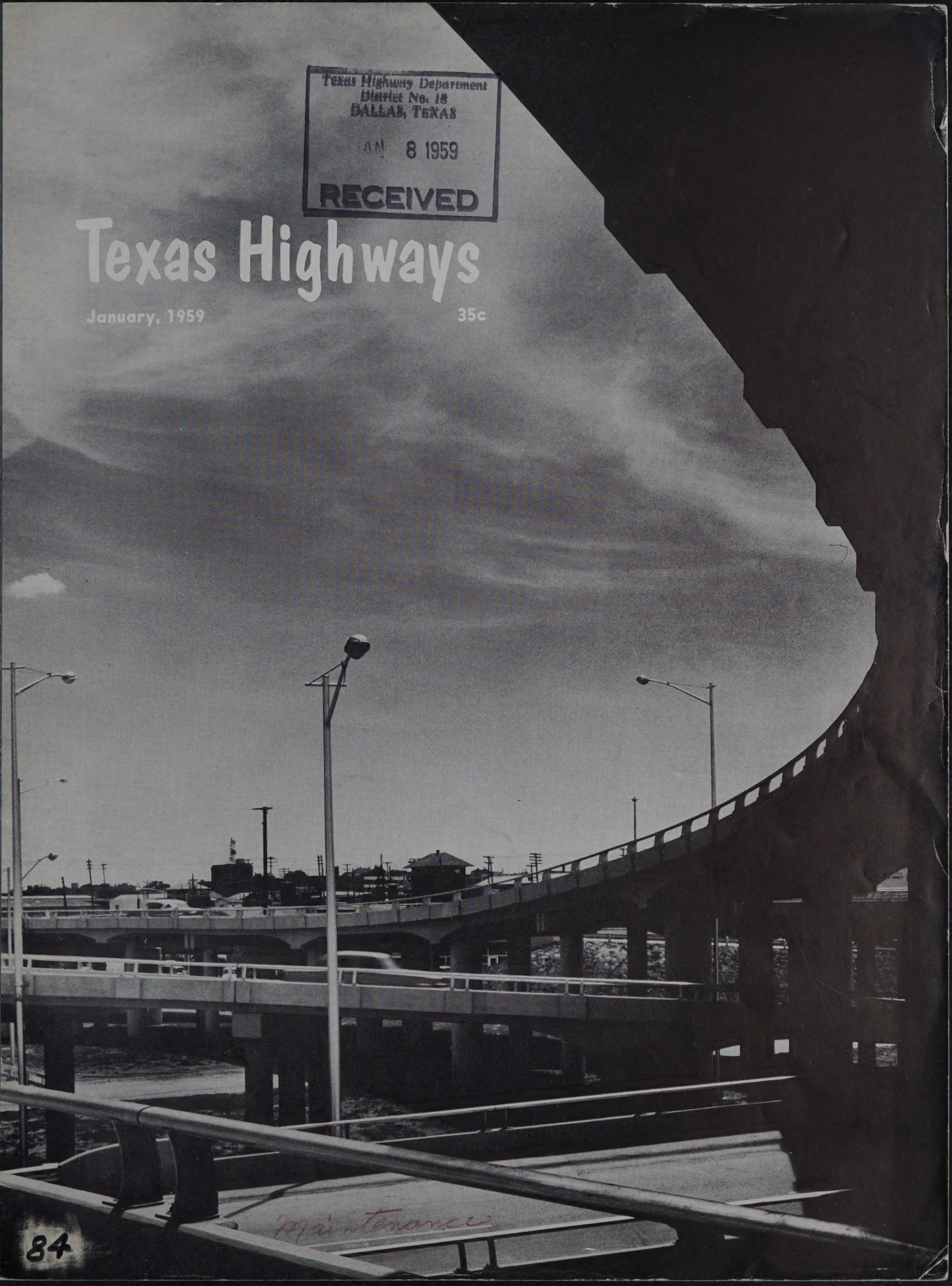
Texas Highways

January, 1959 35c



Maintenance

84

District 1 becomes the first to install new interstate highway signs. Here, on December 16, L. D. Cabaniss, District Engineer, District 1; C. L. Walker, District Maintenance Engineer; and F. L. Stephenson, Supervising Resident Engineer, inspect the brilliant red, white, and blue sign after its erection on Interstate 30 near the intersection of S. H. 34, south of Greenville. This first stretch of highway to be signed, extending 33 miles from the Rockwall County line to Cumby in Hopkins County, will have a total of 24 signs.

Texas Highways

Volume 6 • Number 1

January, 1959

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Interstate

James W. Barr, Senior Administrative Aide
Highway Design Division

The need for a nationwide system of highways had been seen by highway officials since the 1930's. Plans for this network were on the drawing boards before the Second World War, and were looked on with favor by Congress in 1944. Marching slowly through the halls of government, the nationwide highway construction plan was approved by Congress under the Federal Aid Act of 1956.

This Act provided for the National System of Interstate and Defense Highways, a network of 41,000 miles of top-standard, controlled-access expressways to carry 20 per cent of the nation's traffic and to connect 90 per cent of all cities over 50,000 population. The Interstate System, largest public works project ever undertaken in the history of mankind, was designated by the United States Bureau of Public Roads to "serve the national defense, connect by direct routes as many metropolitan areas as possible, and connect with routes of continental importance in the Dominion of Canada and the Republic of Mexico."

The cost of this giant undertaking is estimated from $33 billion to $100 billion, and completion date is set for 1972. The program is expected to reach high gear in 1960 where it will continue until 1967, when the deceleration process will begin.

Under the Federal Aid Act of 1956, Texas was allotted 2,905 miles as its portion of the Interstate System, and a two-billion-dollar share in the sixteen-year project. Texas, then largest state, had the largest quota of miles assigned. And still does, for the allotment has been increased and the road needs of Alaska have not yet been determined and allocations made.

There are seven interstate highways in Texas. Three run north and south, from a point on the Oklahoma border through the Dallas-Fort Worth region, and on to termination points at Laredo, Corpus Christi, and Galveston. Four interstate highways run east-west—one across the Panhandle; and three from points near Texarkana, Shreveport, and Orange, west through the state to El Paso. There are currently four interstate loops designated at Fort Worth, Dallas, San Antonio, and Houston.

Texas has consistently led the nation in interstate construction, and at present has 444 miles completed and 436 miles under construction. The next-ranking state in miles of interstate completed is New Mexico, with 176 miles. North Carolina is second highest in interstate miles under construction with a total of 234 miles.

Texas has also built 402 interstate bridges. California is next in this category with 115 completed.

At present, Texas constructs about $100 million of interstate highways per year, and expends about $30 million for interstate right of way. The $20 million mark for purchase of interstate right of way was reached in November, 1958, in spite of the many problems which have confronted this phase of highway negotiation.

The Federal Aid Act of 1956 put the state into the business of buying right of way for the first time. Up to this date, the counties and cities had been responsible for the purchase of right of way for state and U. S. highways. The infant right-of-way program has grown to fast maturity in Texas, nurtured by 10 per cent state funds and 90 per cent federal on the Interstate System.

As of November, 1956, only nine states had gotten started on their interstate highway programs. Texas led in the total amount of money programed ($34.7 million) but percentagewise, placed sixth in that only 22.3 per cent of the initial $155.5 million apportionment had been programed. New Mexico, a consistent runner-up for the interstate lead in miles under construction and miles completed, had 67 per cent of the initial appro-

priation programed. In contracts awarded, Texas ranked first with $17.9 million interstate under contract.

The reason the Texas Highway Department was able to spring so quickly into the lead on interstate construction was due in part to the prior securing of right of way by the cities and counties. This advance buying meant that the Highway Department could go ahead with its surveys and plans, since interstate design standards were well known in advance of the passage of the 1956 Act.

July, 1957, one year and one month after the Act was passed, still saw only nine states with anything to mile toe hold among these nine states!

At this time, Texas had a total of 350 miles programed at $100,891,000, and led all other states in both money and miles programed. North Carolina ranked second in miles programed, with 248 miles at a cost of $48,795,000.

In October, 1957, there were 2,102 miles of new routes added to the National System of Interstate and Defense Highways. The new routes included not only a 1,000-mile expansion of the Interstate System authorized by the Federal Aid Highway Act of 1956, but also 1,102 miles of estimated saving in mileage resulting from adoption of more direct location of routes previously designated. Texas became responsible for an extra 143 of these new interstate miles with the addition of Interstate 37—running from San Antonio to Corpus Christi. Texas interstate highway miles now totaled 3,033.

The December, 1957, status of the Interstate System, according to statistics released from the U. S. Bureau of Public Roads, revealed that 3,175 miles of the total 41,000-mile system had been advertised for bid, put under construction, or completed, at an estimated cost of $1.7 billion. Just eighteen months after the passage of the initial Act, and almost $2 billion of the original $27 billion total-cost estimate were being plowed back into the American economy. Texas economy had benefited to the extent of $31,983,000 which had been paid out to complete 220 miles of Texas interstate. Under construction that December were 302 miles. Again and still, Texas maintained her national lead in both categories.

The *average* miles under construction for each state at this time was 40.6 miles of interstate, and the nation's *average* number of interstate miles completed was 25.6. Indiana, Louisiana, and West Virginia had no miles of interstate under construction; and Delaware, Georgia, Massachusetts, Nebraska, Rhode Island, Tennessee, Vermont, West Virginia, and the District of Columbia had no interstate mileage completed.

Progress Report

show in completed construction. Texas led the nation in construction under way with a total of 293 miles. The nearest rival in interstate construction was North Carolina, lagging more than 100 miles behind with a total of 167 miles under construction.

Texas also led in miles completed, but with a bare 25.4 miles finished. The next "high-ranking" state in interstate miles completed was Colorado with 12.8 miles. Kansas placed third in the race with 7.9 miles; Arizona fourth with 6.2; and neighboring Oklahoma was fifth highest-ranking with the mighty total of 3.1 miles of interstate completed. Washington and Missouri each had a .2-

In comparing the 1958 construction records with 1957, Texas has added 183 miles to her interstate miles completed during the year, and has upped the miles under construction by 150, bringing the total from 292 to 436 in a single year. The nationwide *average* of interstate under construction is now 73 miles.

For the coming year, Texas is scheduled to start 200 miles of new interstate projects, and will be well on the way to paving the first 1,000 miles of the tremendous 3,033-mile interstate construction program in Texas.

POISON MOST DEADLY

Sign plating requires the use of cyanide, then our electroplating plant men must dispose of it safely after it has served its purpose.

The dark phantom which artists symbolize with skull and crossbones hovers always when man and cyanide are in the same vicinity. One liquid drop taken internally will bring death. For cyanide is a Jekyll and Hyde chemical compound which must be handled with care while it does its good work and must be gotten rid of when its services are required no more. This is common knowledge at the Highway Department's electroplating plant in Austin where day and night shifts of employees in Equipment and Procurement Division work in close proximity with cyanide, readying a long procession of steel sign plates for a future along the highway. Signs must undergo a bath in deadly cyanide solution during the series of dousings required to prepare them for painting.

For, like nougat dipped in chocolate, when steel is immersed a specified time in alkaline-cyanide electroplating solution, it will come out wearing a coat. Thus fortified with zinc, it is insured against rust and corrosion should its painted face suffer chipping or lacerations when it is staked out on the job. Every staunch highway sign in every district has been through such a bath at the electroplating plant in Austin.

The sludge from this particular vat is made up of what the plant personnel terms "dead" grease, sodium carbonate, and other chemical waste particles, all of which form a mass of lethal gray mud because they are shot through with cyanide particles.

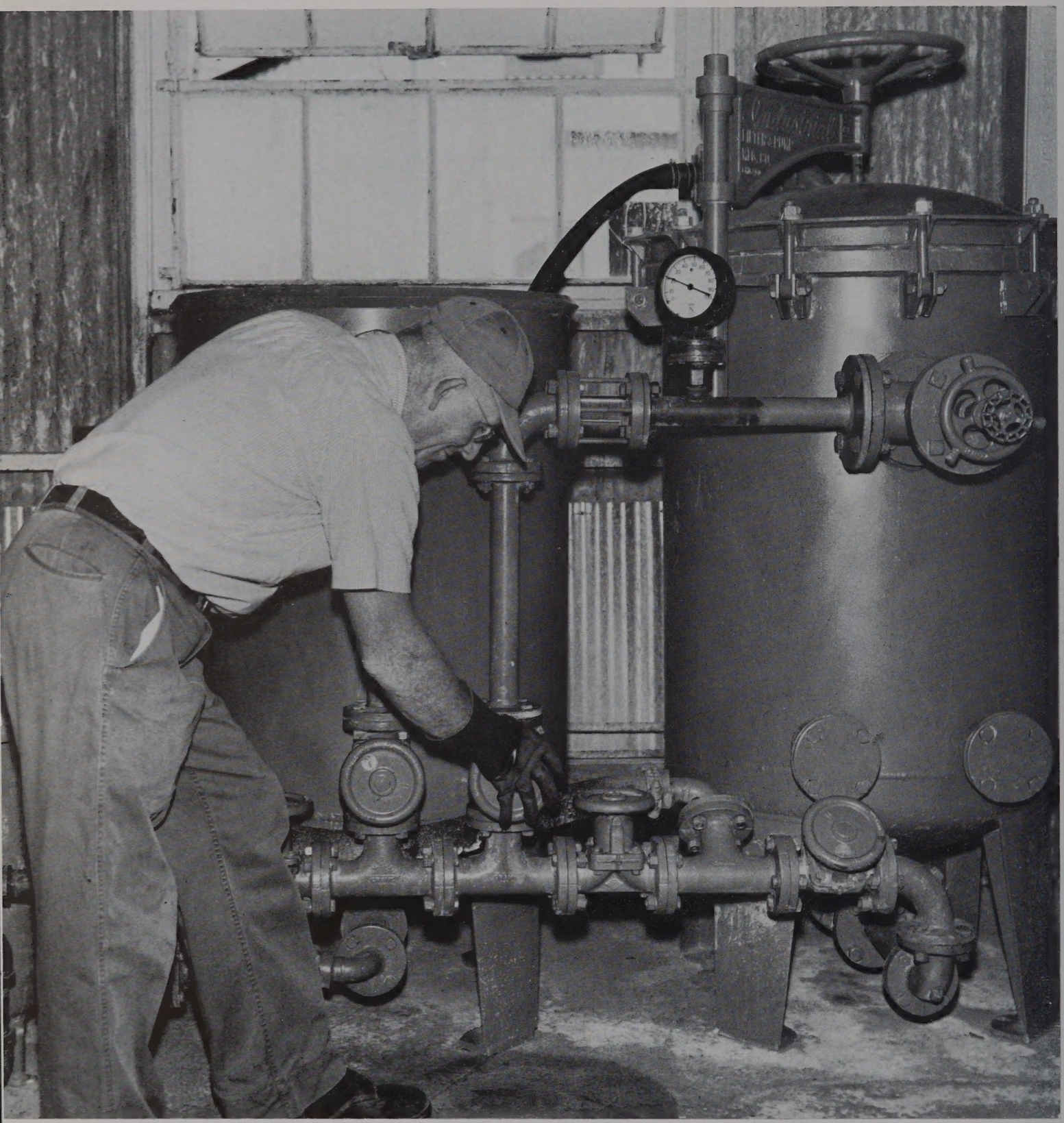
What to do with this mud when the vat required cleaning was a poser which the Division solved several years ago. (Undisposed of or left in an area where humans may come in contact with it, the sludge turns into a "Mr. Hyde." So as garbage it requires special attention.)

An instance of the way the electroplating plant made good riddance of a wholesale amount of its cyanide sludge took place last winter when Equipment and Procurement Division at Camp Hubbard in Austin was obliged to uproot itself to move into temporary quarters during construction of the Division's new building.

The time was opportune for cleaning the cyanide vat, and workers emptied it of what was an estimated four years accumulation of sludge. No less than seventeen oil drums were filled with the noxious paste. These were welded tightly shut, then the workers hoisted them onto a truck for the first lap of a prearranged trip to a faraway place.

Employees contact with the 3,600 gallons of deadly cyanide in this vat is remote, as may be seen by the manual control which Ernest Matlock (foreground) is operating. One switch on the control lowers into the cyanide, zinc, caustic soda mixture a chain hoist which holds the signs. The other switch raises wet signs to a track overhead and manipulates them to a place for drying. Chris Jones (background) assists. Both wear regulation gloves. Exhaust fan pulls fumes away from workers.

Edgar Neumann, of Equipment and Procurement Division's electroplating plant, checks a steel cage containing zinc balls before he suspends it in the plating tank. These hang every ten inches along the copper pipes and act as an anode. The steel signs themselves are the cathode necessary to the electroplating action. An electric current of 35 amperes per square foot of sign area is sent through the vat to accomplish the electroplating.



Murky cyanide solution from the plating tank is routed to this filter for cleaning. Clear glass section of pipe (to left of and below pressure gauge) reveals the clarity of the liquid returning to the tank. Impurities left in the filter are pumped directly through a hose (above pressure gauge) into an oil drum outside the window. Here, Neumann adjusts filter intake.

When an oil drum is filled with cyanide sludge, it is promptly sealed tight to await its ocean voyage. Endress Bohls welds this drum shut. It will wait with another (in background) for a Highway Department truck to take it to Galveston.

The first 213 miles of the journey took the barrels over the highways to Galveston harbor. Then, via an ocean freighter, these poisonous tokens from the bottom of a cyanide vat back in Austin became a sizeable contribution for what has become a U. S. Government-designated dumping place for problem refuse—all radioactive wastes, for instance, are consigned to this spot. The jumping-off place is 280 miles offshore in the Gulf of Mexico, where lies one of the deepest underwater valleys of all the world's oceans. Lykes Brothers Steamship Company gives free accommodations to the sludge on one of its Atlantic-bound freighters, the only specifications for its packaging are "full barrels, no leakage." Port authorities who briefed Equipment and Procurement men said such provisions insure the barrel's drifting to the bottom of the ocean valley. Then, after the drum has eventually disintegrated down there, probably from pressure at such a depth, the active poison which does remain will be diluted in an oceanful of water, making it harmless.

Such great clean-up projects involving large amounts of sludge in the bottom of the cyanide vat can be considered a worry of the past, electroplating plant authorities believe. For during the past year, in the temporary location at Camp Hubbard, an industrial filter for the vat has been installed. There still will be some cyanide waste, but the removal of this substance will no longer, as in the past, require men with shovels and masks and rubber boots, nor will it require a shutdown in operation while a mechanical scoop does the dredging.

With the new filter the waste is routed through a hose into an oil drum which stands waiting to be trucked to Galveston, once filled. The filter has drastically reduced the amount of sludge. So much, in fact, that electroplating men, as well as Department chemists, say last winter's seventeen-barrel shipment will be the Highway Department's greatest cyanide contribution for all time to the eternity of Davy Jones' Locker.

BRIDGE SHIFTING

Carl V. Ramert, Senior Resident Engineer
District 13

A project on the 1957-58 Consolidated Highway Program included widening and rebuilding structures and approaches on U. S. 77 from three and one-half miles north of Victoria to three and two-tenths miles south of the junction with F. M. 682.

These structures were single and multiple seventeen-foot I-beam spans, concrete slabs, and timber piling, with 22-foot roadways. New structures were to have roadways with a 42-foot minimum width.

It was evident that a large sum of money would be spent in providing detours for the structures to be rebuilt. This, of course, presented a challenge—to arrive at a method of providing safe, adequate detours and still construct no more than would be required in the completed, permanent roadbed.

There were ten structures to be rebuilt. By shifting the center line of the roadway to the left twelve feet on two of these structures, the alignment could be improved and the original structures utilized until one-half of the new structure was completed.

At locations on which neither alignment nor grade could be altered, a Design 6 corrugated galvanized metal pipe arch with bulkheads against the outside line of existing timber piling was used to replace the single and double I-beam spans of the existing structure. Traffic was routed over this section while the existing structure was removed and approximately half the new bridge was constructed. Traffic was then placed over the new portion. Removal of the detour was accomplished with the contract bid items of Salvaging Flexible Base, Common Road Excavation, and Removing Corrugated Galvanized Metal Pipe Arch. This method of providing for traffic was about one-fifth the cost to make a completely independent detour at these locations.

The multiple I-beam span structures that were to be replaced presented a problem in that independent detours could have become quite costly. In discussing the problem with highway personnel and with some of the contractors working in the Residency, we were able to arrive at a workable solution.

Cost records kept by the Contractor indicated a unit cost of around $350 per span to shift the existing I-beam spans. When the project was set up,

Two additional untreated timber piling were added to each bent for the extension of existing caps. A 6-by-14 timber was placed on each side of the timber piling three inches below the interior timber caps.

The entire bridge is ready to be shifted. Note the 4-by-3-inch angles on the false caps and under the existing caps to facilitate movement.

Each bent was raised about one-half inch and all piling cut off flush with the false caps. Caps were then lowered on two and three-eighths-inch O.D. pipe rollers spaced on approximately eighteen-inch centers.

The abutment bent was handled similarly. However, when the end spans were raised, timber piling were cut off fifteen inches so that a salvaged cap could be placed directly under the existing cap. This was done to avoid having to open up the roadway at bridge ends.

Two men per bent were required to operate the 25-ton ratchet screw jacks. With a jack-travel of thirteen inches, movement was slow enough that no one crew ever fell behind or advanced ahead of the other enough to create binding.

This bridge contained eight 17-foot I-beam spans. Timber piling for shifting the superstructure were driven at an earlier date. This shot was made ten minutes after jacking operations began. Traffic continues to move over the bridge.

Even though movement was slow, the bridge was in its final position three hours and forty-five minutes later. Rate of movement averaged three feet ten inches per hour.

the cost of moving the bridge was considered subsidiary work to the various contract items. Possibly, it would have been advantageous to have a special item for moving structures.

Plans for this project were prepared, and construction was supervised by the personnel of the DeWitt County Residency, under the general supervision of H. P. Krause.

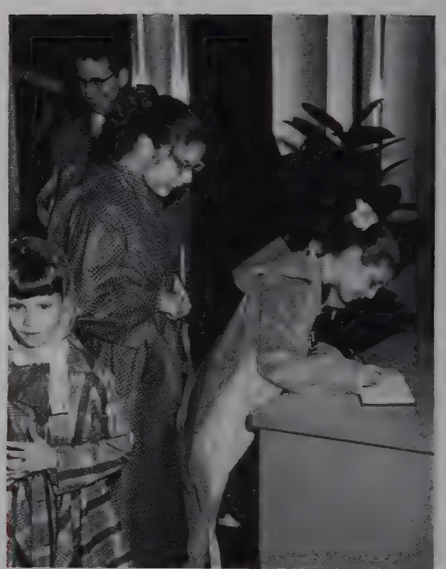
H. B. Zachry Company was awarded this contract, with D. R. Cloud appointed as General Superintendent.

Design and traffic will continue to demand the replacement of existing highway structures. By presenting these methods, perhaps thoughts might be planted and expanded whereby more time and money can be saved.

The new headquarters building of District 19, Atlanta, was officially opened November 17. Incorporating modern and functional design in every detail, the building provides 10,000 square feet of floor space and houses 81 employees.

New

DISTRICT 19 HEADQUARTERS



Each visitor signs in as the new building holds open house for employees, their families, and friends in the Atlanta area.

The ribbon is cut—officially opening the new District 19 headquarters building for business. D. C. Greer, State Highway Engineer; Herbert C. Petry Jr., Member of the State Highway Commission; and G. A. Youngs, District Engineer, District 19, look on as Marshall Formby, Chairman, State Highway Commission, snips the ribbon.

Assistant District Engineer B. L. Frank holds conference with the Design Section in the conference room of the new District 19 building. Seated, left to right, are Charles Wilcox and James Markham, Junior Draftsmen; S. R. Wimberly Jr., Senior Designing Engineer; R. H. Barr, Senior Draftsman; and Alvin M. Benefield, Engineering Assistant. Note sliding panels with maps and other reference materials readily available on wall displays.

In the drafting room, a new concept in office furnishings is evident with each desk having a lower desk top, more comfortable chair, plenty of file space, and bookshelf area. The draftsmen will no longer have to work on desks piled high with books and reference material. In the foreground, left to right, James Markham, Junior Draftsman, discusses a problem with Robert Barr, Senior Draftsman. Reva Sharrer, Typist, works on the files while Charlie Wilcox, Junior Draftsman, and Alvin M. Benefield, Engineering Assistant, work at their desks.

Coffee breaks are a pleasant and welcomed part of the day in the new cafeteria and coffee shop, which is equipped with a complete kitchen and self-service facilities.

Barbecue and potato salad were served up in man-sized portions at the Atlanta High School Gymnasium, where Highway Department employees were the guests of the business and professional men of Atlanta. »

Evolution of

Every period of history has been influenced by a trail, path, road, or highway. Thousands of years before the need arose for today's high-speed thoroughfares men recognized that arteries of travel were necessary to survival in a hostile world.

Censor Appius Claudius, in 312 B.C., was the first man to truly put this realization to use. He ordered a road built which became known as the Appian Way. This magnificent system of highways, built of many courses of stone and mortar and paved with hard flint lava, was the greatest advance in road building in recorded history. The principle of controlled access was utilized, protecting pedestrians from fast-moving wagons and chariots while separating opposing directions of traffic. Many portions of this ancient highway are in use today.

Via Appia was the prophet of things to come. But for centuries, the prophet's voice cried in the wilderness. Controlled access and adequate highway design were given little thought after Via Appia. Its secrets were known, and although unused, never forgotten.

In the year 1756, a Scotsman was born whose dedication to the art of highway construction was to be felt through the centuries. He was John Loudon MacAdam.

MacAdam was appalled at the conditions of roads in his time. He didn't like their construction, the exorbitant tolls charged for their use, nor the men who supervised their building. He found these men to be untrained, underpaid, and interested only in pursuing political favor.

Through hardheaded persistence, John MacAdam pushed his way into the English Parliament buildings, finally persuading the authorities to turn over to him the outlying roads around Bristol. Here he put his beliefs into action. He advocated a raised roadway bed, convex in design, adequately drained, paved with uniformly crushed stone, and packed hard enough to be impervious to rain. By adding lime to his roads, he found a hardened surface would result. This process, since called macadamization, gave mankind a new and better kind of road. MacAdam's theories of a dry subgrade and adequate drainage are still followed in building today's highways.

As MacAdam was improving the roads in England, some of which were centuries old, other men in other places were laying the infant paths and trails which would be an entirely new system of roads and highways as time passed.

In the territory to become the United States of America, highways had their beginnings in the portage paths of the explorer and Indian. Early French explorers, in search of a direct route to China, followed these paths overland from one river to another.

As the country was settled, industry and commerce needed roads to take tobacco, the main money crop, to river landings for shipment to the mother country. It needed roads for its mail. Out of this particular need grew the old Boston Post Road and other rough thoroughfares which passed through the vast eastern wilderness.

The American Revolution put a sudden quietus on organized road development in our infant country. Private financing gave rise to the toll roads called Pikes. The famous Philadelphia-Lancaster Pike provided the first extensive broken-stone surface for the 62 miles between Philadelphia and Lancaster, Pennsylvania.

Roads were moving west. And they were getting better. Daniel Boone cut his Wilderness Road through the Cumberland Gap in the Alleghenies, while the Natchez Trace was struck through the forests between Nashville and Natchez. Then, in 1806 the first important road was built with federal funds. Called the National Pike, it served the territory northwest of the Ohio River. The Oregon Trail, plank roads, the Maysville Turnpike, El Camino Real—roads and trails were etching the land.

Then followed the disastrous dark ages for roads in America. That fearful machine, the Iron Horse, suddenly appeared to snatch business away from Conestoga-wagon and stagecoach owners. The trains could carry people and freight at 25 miles per hour in every kind of weather, while wagon and stage roads were often impassable mud traps. The trains, amid sparks and cacophonous machinery, were winning out in a race for the overland-freight dollar.

But railroad building took time. It was slow, tedious, and dangerous. With every mile of track, problems developed with the terrain, with supplies, and worst of all, with the Indian. Until such time as the rails from East and West would meet, commerce still had to go through. The bank accounts of the wagon and coach companies were somewhat appeased by this situation. They still had their business in the West. The Pony Express, Butterfield's Overland Mail,

and the Camel Express continued their runs. But these were the dying gasps of a doomed industry. And adding to its death knell was the telegraph.

At Promontory Point, Utah, in 1869, the rails met, taking over where the stage companies left off. Two worlds were now one, joined by twin strips of steel. The Iron Horse had won the temporary honor of being man's fastest, cheapest, and most dependable form of transportation.

Nineteen years later, and thousands of miles to the east, at the World's Fair in Paris, France, two momentous events were taking place. By far the most spectacular, the opening of the 984-foot Eiffel Tower

The old National Highway near Amsterdam, Ohio, about 1913.

the Highways

raised the eyebrows of the world. Below that Tower, another engineering marvel was revealed. This was the first public exhibition of a horseless carriage, that strange device called an automobile.

But in 1900, eleven years later, 4,192 horseless carriages were sold. Something had happened to the needs and habits of mankind. The machine was soon recognized as a device with practical applications.

Within a few years, the United States began to build better roads. By present standards, those efforts were still just slashings through the wilderness. But improved roads were coming. In 1905, there were 25,000 cars sold. In 1910—181,000. As the railroads had displaced the stage, au-

A well-traveled country road near Meacham Lake, Duane, New York, about 1912.

Photo by Courtesy Bureau of Public Roads Department of Commerce

Photo by Courtesy Bureau of Public Roads Department of Commerce

It was best to get in a rut and stay there. An earth road near DeQueen, Arkansas, about 1918.

tomobiles began to displace some of the rail profits.

With the steadily increasing importance of the automobile, state and federal aid were slowly enacted and showed their effect on road construction. Some states had paving all the way from one boundary to the other. But a passing motorist could come to that line and perhaps find himself in a state where the continuation of highway was nothing but a pool of thick, black mud.

With the thought that government of the people sometimes needs a push to start moving in the desired direction, private clubs and associations were soon forming for the one purpose of increasing public interest in better roads. As a result, highways benefited from increased legislation. More cars were sold to travel the highways—more highways were needed to handle them.

Throughout the Southwest and West, road construction was following the famous old trails. These avenues of prerailroad commerce were logical locations, as most routes were direct and well known.

During the long and colorful history of Texas' early days, dozens of trails crossed and recrossed the country. Many were formed during the great cattle drives to the railhead at Abilene, Kansas. Other trails reflected the routes of early Spanish traders and missionaries. The most famous of these was the Old Spanish Trail, passing from the east to San Antonio westward through El Paso. This ancient route is now the site of U. S. 90, with the alternate from San Antonio west as U. S. 290. The old Chisholm Trail lies just a few miles to the west of present U. S. 81 from San Antonio north to Fort Worth and into Okla-

Now U.S. Route 1, this was the condition of the Washington-Richmond Road near Dumfries, Virginia, in 1919. »

Photo by Courtesy Bureau of Public Roads Department of Commerce

« Although there must have been a reason for it, present highway engineers would be hard pressed to justify such bridge construction as this. West of Hendrysburg, Ohio, this S-bridge was located on U.S. 40.

homa. El Camino Real, legendary route of Spanish horsemen and Anglo-European traders, was transformed into S. H. 21 moving northeast from San Antonio.

At the turn of the century, Texas roads were in about the same poor shape as every other state. Because of frequent extremely muddy conditions, many farmers had a profitable side business going by keeping a team of mules handy to pull motorists through the mire. Price: $1. A few instances are known in which farmers, by means of their own ingenuity,

kept sections of the road in a perpetual state of mud month after month. Some found this activity more profitable than farming. In later years, after formation of the Texas Highway Department, teams were maintained in certain areas for free assistance to motorists.

In this early stage of highway development, it behooved a motorist to get in a rut and stay there. On one stretch of road between Austin and Fredericksburg, there was at one time only a single set of ruts in dry weather. If one driver met another approaching from the opposite direction, it was usually a matter of much discussion and finally a tossup to see who would leave the rut, permitting the other to pass.

Between the years of 1903 and 1911, the Texas Legislature made many attempts at forming an agency for supervision of road construction. By 1917, when such an agency was required in order to receive Federal funds, the Texas Highway Department was formed. The same act that created the Department also provided state aid for construction and called for a license fee to be collected for every automobile in the state.

Today, where great diesel-driven bulldozers, scrapers, and haulers push and mold the ground swiftly and easily, mule-drawn equipment once plodded day after day. The work was slow and difficult. Scrapers and blade graders, wagons and hand labor with picks, shovels and wheelbarrows—this was the equipment that built the Department's first roads.

Even as it had benefited the enterprising farmers, mud was the Texas

This creosoted timber bridge across the South Sulphur River in Hunt County, Texas, was a pleasure to drive over. Steel traffic treads took the travel off the timber floor and provided a smooth surface.

In 1913, before the advent of farm-to-market roads, the rural dweller had to ride over roads like this which usually became treacherous in wet weather. »

Photo by Courtesy Bureau of Public Roads Department of Commerce

These aren't medians separating three lanes of traffic. The parallel strips of wood are what you drove over to save wear on the bridge over Feeder Creek, south of Smithville in Bastrop County.

Highway Department's biggest headache. Originally highways were located whenever possible along divides to save the cost of drainage structures. Stream crossings were made at points used by wagon teams, and later timber bridges were constructed over larger streams. There were culverts of wood, rock, or galvanized iron on smaller streams. Most structures were subject to periodic overflowing.

As the youthful Highway Department got underway, it was required to build roads to withstand near-Arctic snowstorms in the Panhandle or subtropical humidity on the lower Gulf Coast. It had to build roads through snake-infested swamps and through deserts of shifting sand. Engineers were delving into problems entirely new in content and consequence. It was a period of intense learning and experimentation. A division of the Department was created to do nothing but study new techniques and materials used in highway construction and maintenance.

Across the land, every state was forming an agency to supervise highway building. Each had its own problems of climate, terrain, and urban and rural distribution of population. Some had to build through mountains. Others had to build across wide rivers. As the years passed, instead of fickle dirt and rock roads or rotting planks, great ribbons of concrete and asphalt marked the land. America had been put on wheels. Highways from one coast line to the other gave those wheels a proper surface to roll on.

Way back when . . . a certain road in Victoria County, Texas, looked like this.

Improved highways and streets are moving our cities outward, joining communities with highways lined on both sides by business and housing where open country used to stretch.

Censor Appius Claudius' principle of controlled-access highways provides the pattern for tomorrow's streamlined thoroughfares. Multilane, divided highways will stretch from one end of the land to the other. Highway needs have not been forecast beyond 1975, but following the pattern of the past, road mileage will continue to multiply, designers will continue to strive more and more for safety as the streamlining process continues.

Painful Evolution . . .

The information below was lifted from a newspaper article which was reporting the speech of a man who got the information from the National Safety Council, which had quoted the Nebraska Petroleum Industry Committee. . . .

The perils of motor traffic are something to consider in these days and times, but they were something to put gray hairs in the heads of both the onlookers and the motorists in the early part of the century. The following clipping, appearing in the Corsicana Sun with a Boston dateline, gives an idea of automobile problems in "the good old days."

"Those new-fangled 'gas-buggies' were quite a problem back in 1908.

"Arnold H. Vey, traffic engineer of the New Jersey motor vehicle department, said in a prepared address today at the 17th annual convention of the North Atlantic Highway Officials that the national safety council had quoted the Nebraska petroleum industry committee as listing the following rules as in vogue that year:

" 'On discovering an approaching team, the automobilist must stop off side and cover his machine with a tarpaulin painted to correspond with the scenery.

" 'In case a horse will not pass an automobile, notwithstanding the scenic tarpaulin, the automobilist will take his machine apart as rapidly as possible and conceal the parts in the grass.

" 'Automobiles must be seasonably painted; that is, so that they merge with the ensemble and not be startling. They must be green in the spring, golden in the summer, red in the autumn and white in the winter.

Automobilists running in the country roads at night must send up a red rocket every mile and wait ten minutes for the road to clear. They may then proceed carefully, blowing their horns and shooting roman candles.' "

Maintenance Personnel Meet

In the 25 districts of the Texas Highway Department, there are usually 25 slightly different ways of doing things. A chance to get together for a verbal exchange of ideas and opinions was provided maintenance personnel at a three-day maintenance conference October 28 through 30. This first such conference was held in Austin, with personnel from all districts attending.

State Highway Engineer D. C. Greer addressed the group at the opening meeting. Aims of the conference as expressed by Chief Engineer of Maintenance Operations J. A. Waller, were the exchange of information, development of uniformity, a review and discussion of policy matters, a better understanding of the Texas Highway Department, and economics of operation.

Among subjects discussed by the 130 conferees were general maintenance practices, signs and pavement markings, safety of personnel and equipment, landscaping, and physical plants of maintenance sections and warehouses.

Included in activities for those attending the three days of conferences and discussions was a tour of the new Materials and Tests building at Camp Hubbard.

J. M. "Mulky" Owens, District 14, and Bruce Bryan, District 5, have a private discussion on methods of repairing freeze damage.

During a recess for leg stretching, Ross Scott, District 12 (center foreground), discusses his report on repairing concrete pavement with Joe Russell, District 14. Joel Willson, District 5 (background), bends an attentive ear to another conversation.

A report is made by Pavement Marking Committee members George Cleveland, Edward L. Sanders, I. H. Crutcher Jr., Robert H. Ziegler, and J. M. Harris.

F. M. Davis, District Engineer, District 15, greets Gene Cuenod of the Main Office, as Ed Bluestein, District Engineer, District 14, looks on.

Visiting maintenance personnel were conducted through the new Materials and Tests building, observing operations, and many of them seeing for the first time exactly what happens to the material D-9 receives for testing and evaluation. Supervising Paint Engineer K. K. Moore explains a step in paint analysis to (left to right) Joe Bingham, Bill Davis, and J. R. Stone, District 2; James Sloane, District 17; James W. Tobey, District 2; and Joe Hanover, District 17.

Training and Upgrading

Lester P. Landgraf,
Senior Resident Engineer
District 20

As most of you gentlemen present are probably aware, especially if you are on a residency level in the Highway Department, the program of training and upgrading inspectors is a continuing and demanding responsibility. Before discussing this subject any further, the word "upgrading" as used in this talk, means to raise the skill and efficiency of the inspector, and not necessarily his salary or title.

The Resident Engineers in charge of offices very likely realize this responsibility to the greatest extent, because the burden of the construction inspection lies basically with them, and their inspectors are their lifelines to good construction. The primary purpose of this paper is to deal with the problem as seen by just such a person. I hope, in presenting this talk, that we can all achieve a few enlightening ideas on this subject. I know that this problem is not as clear-cut as it may seem upon casual observance; in fact if it were, I would not have been requested to make this talk today.

The task of training qualified inspectors is a problem for all of us, although I believe that in District 20 the acute need of these trained inspectors exists for two primary reasons:

1. The highly industrialized and unionized area in which a large portion of District 20 is situated has a much higher wage scale than predominates in the majority of the state. This means our personnel are drained at a time when our training begins to bear fruit.

2. I believe (this is purely a personal opinion, and a few of you may take issue) that District 20 has probably the most difficult construction features, due to its terrain and weather conditions. Close inspection is therefore necessary.

With these thoughts in mind, I would like to enlarge on this subject.

*Speech presented at the Thirty-second Short Course.

Inspectors

The first reason the Resident Engineer needs trained inspectors and a program of training and upgrading inspectors is to assure that he has accurate inspection of projects at all times. The only way to achieve this is by having inspectors with a good knowledge of the work as it should be performed. I will not take issue with anyone who argues the point that there is nothing like experience to acquire knowledge. However, I do believe that in the necessity of conserving time, a few weeks, days, or even hours, in a brief class of pertinent subjects can be invaluable in acquiring this knowledge.

Second, a trained inspector will also feel more responsibility to his job if he has the know-how to oversee his inspection work. I am sure that all of you through the course of time have performed jobs which you did not feel as responsible for, or as interested in, because you felt that you did not possess the specific academic or practical background the particular task required.

Third, I believe that any contractors who are present will bear me out on this point—that through trained inspectors we can achieve a more uniform interpretation of our specifications.

I do not know that this story is true, but it might get a point across. The story goes that there was a new inspector on the job watching common borrow and common road excavation on a particular project. He kept insisting to the superintendent, for the contractor, that the material he was moving had too much P. I. The superintendent did not understand what he was talking about at the time, and did not give it too much thought until the inspector kept insisting, day after day, that there was too much P. I. in the material. This finally got on the superintendent's nerves, and he asked the inspector what he meant. The inspector then told him the material had too many roots, and too much grass

in it. Now, if this man had any experience with lab work, or a brief schooling on soil, it would have never happened.

A uniform interpretation of our specifications can and should be an everlasting goal for everyone connected with the Highway Department, because this will, in the long run, mean a more economical construction of our highways. It will enable contractors to bid from one district to another with greater ease.

Let me point out what we have done in our District and in our residency to date in trying to achieve this goal.

The Construction Division in Austin started an Instructors' School on September 8, 1952. This was the first in a series of three schools, designed to cover all the subjects in construction inspection. These Instruction Schools were spread over a three-month period, although each school only consumed approximately a week's instruction. Texts were furnished by the Construction Division, and were supplemented by picture slides showing various phases of construction. I believe that some of you men present very likely attended one or more of these schools in Austin.

When the representatives from District 20 returned to Beaumont, they immediately began the first school in the District Laboratory with twelve men present—approximately one from each residency. These men, in turn, went back to their respective residencies and disseminated the information on the local level. Since that time, we have conducted eight other inspectors' schools in the Beaumont District—one or two each year, as deemed necessary by the residencies. These were all conducted by men who had pertinent knowledge of the subject. Classes consisted of 17 to 25 men each, on subjects such as hot mix, concrete paving, small structures, earthwork, and flexible base. To date, we have taught 173 men in the Beaumont District. Classes have been conducted in the most part during the winter months, an off season for construction work.

These schools have all been under the supervision of our District Construction Engineer and District Laboratory Engineer, assisted by men in the field with actual and long-time experience on their subjects.

In conducting classes, they have used to a great extent information published by the Construction Division in Austin. During the course, it is the practice of the instructor to require every student to perform in the laboratory all tests that he will be held responsible for in that particular phase of construction. For example, in a concrete pavement class, students have to design a concrete mix on their own. The district schools also use slides, furnished by D-6, which show various construction operations to better acquaint the student with the work.

We believe that conducting these schools on a District level with information from Austin is a most desirable method because it promotes uniformity in inspection. We also use the workbook the Construction Division has published on specifications during the classes in acquainting new personnel with our Green Book.

It is amusing to ask old, experienced inspectors questions in this workbook to see how one can be led astray from our standard specifications by usage, individual day-to-day interpretation, and faulty memory. If you have any doubt, try it yourself.

On the residency level, to disburse the required information obtained from District-level classes, we do not hold any type of formal schooling, with an exception which I will note later on. This information is usually passed from one individual to another on jobs where the information is being used—in other words—on-the-job training.

The shuffling of personnel from one job to another through the course of jobs helps perpetuate information throughout the organization, if individuals are willing and able to grasp this information. We also try to send men to the District schools held from time to time who will benefit most by the instructions—men who are usually unschooled in this particular phase of inspection, but, in our estimation, are capable of picking up this information rapidly from an instruction period. This is a problem which has to be weighed carefully because although individuals may be capable and willing, others may be more capable of picking up the information in instruction classes, rather than in practice. To make a training program effective, these things must be considered in choosing the men to attend District-level courses.

It should also be kept in mind that when these men arrive back in the residency, they will be required to pass on the information they have learned to other individuals in the residency and on the jobs where they will be working. We realize that this type of training has its faults and limitations in the possibility that one attending these schools on a District level can, and does, sometimes interpret things in a different way, and may pass out information contrary to the usual and desirable departmental policies. To offset discrepancies that arise, either to the information acquired in the District or on a residency level, we have had in use what is known as a Roving Inspector, whose duties are to keep uniformity in job inspection within the residency. This may seem like an extravagant construction cost; however, when a residency has five or more projects under contract at one time, it is difficult for the Resident Engineer to be on the projects, spending enough time with each inspector to assure that the project is being well inspected.

The Roving Inspector should, and in our case I know he does, spend a good deal of his time with the younger inspectors who naturally need more supervision. This system has advantages other than uniformity. It allows the Resident Engineer to promote younger inspectors who ordinarily would not have the time or experience to handle the job by themselves. And, as I pointed out at the beginning of this paper, this is a very worthwhile consideration in our organization, due to the large demand

for good inspectors.

One problem that can arise with this Roving Inspector system which will have to be guarded against, is the interference with the line of communication between the contractor and the engineer. The Roving Inspector should confine his negotiations to the inspector on the project and the Resident Engineer. This should not give any trouble if understood at the beginning of each project.

The Roving Inspector should be the key man in this instruction and upgrading program carried out on the residency level. He should not only keep the idea in mind of uniformity in the specifications, but should remember that he is, in a sense, an instructor in all matters pertaining to the inspection of highway construction. The man for this position might be a difficult person for some resident engineers to find, because he will have to be a man with a great deal of experience in construction inspection. He also must be very diplomatic to cope with the everyday problems he will encounter.

This position in the residency will parallel that of the Construction Engineer on the District level, which most districts now have in operation. Basic ideas he should strive to instill among subordinate inspectors in charge of jobs are:

1. Stay several steps ahead of the contract in all field staking and layout operations.

2. Keep all field-office paper work up to date in a neat and orderly fashion so that it can be readily available, or transferred to another inspector if necessary.

3. He should be made aware of his responsibility and be given an opportunity to work out his own problems where possible.

4. When questions arise from the contractor, they should be answered with the plans and specifications at hand, where both parties fully understand the question and answer.

5. The inspector on the job should keep a permanent official job diary. This diary should be kept from day to day. It has been found in our residency that it is handy for the inspector to keep a private notebook in which he can note things that he is apt to forget from one job to the next; that is, along the procedure of the jobs.

6. In the case of an inspector in charge of his first job, it is well to show him early what will be expected of him in making out monthly and final estimates and supporting papers. This will make him aware of the necessity for keeping better records throughout the job.

7. Before each new item of work is started on the job, the inspector should read up on the item in the Green Book, and the special provisions for that particular job.

The fact that we have a Roving Inspector also helps the new inspector psychologically. He is aware that he has someone to fall back on for small problems which might arise that he would not feel as free to carry to the Resident Engineer.

In our particular resident office, using the heretofore mentioned training program, we find it beneficial to hold periodical meetings of all job inspectors. These meetings are held in the resident office during the construction season, when the questions arise, to help clear up questions among inspectors. We find that although these problems do not necessarily confront each inspector, benefit is derived by their mutual discussion.

In training our residency laboratory personnel, we pick men who have attended the district classes and seem to do well in the laboratory portion of instruction. A laboratory in a residency usually requires one man for its normal operation and the bulk of his work is running soil constants, screen analyses, and batching out concrete at the local transit-mix concrete plants, after having designed the mixtures. The danger that this man will vary from the standard procedure in running P.I.'s (which is a constant pitfall if the man works by himself) is overcome by the use of test samples sent from the District laboratory periodically for him to use as a check.

We also let this man work in, and with, the District Laboratory for a week or so each year to bring him up to date on the laboratory procedures, and to check his own standard lab procedures.

In helping us arrive at the results of this training program, let us look back to the days before the program. It would be hard to state a definite number of years required before a man could be put in a responsible job on construction under the old method of catch-as-catch-can training, but I believe four to six years was an average time. Of course, the period varied widely with the individual capabilities and the job opportunities given him. Compare this to today's program. We can now, by observing men in this training program and picking the better ones, have men taking care of a construction project in two to three years with ease. This can be compensated salary-wise by placing such men at the top of the particular brackets, within the confines of the title and salary classification outlined by the Department.

Resulting from this training program is the rapid progress of lower grade personnel who are able, interested, and willing, into higher grades. This is realized through a systematic instruction program on the District level, and carry-through to the residency with the Roving Inspector keeping a close watch on newly developing inspectors.

The acute need of inspectors in District 20, at the time this training program was begun in Austin, was evident due to the lack of trained inspectors to meet the foreseeable expanding highway program.

Since that time, we have been endeavoring to improve and carry on this program because we feel that it has been profitable to the Department. It has helped the individual to better understand and assume his responsibilities, and what helps the individual eventually helps the Department.

We believe that through this program we have trained and can continue to train enough inspectors to meet the demands as they arise.

About

an Iron Pipe in Saratoga

If ever our modern world has produced a mutual back-scratching situation, the interweaving of the petroleum industry and modern highway development is an example. It is reminiscent of the ancient riddle regarding the seniority of the chicken and the egg. It is impossible to say with certainty that either the oil industry developed the highways, or the highways developed the oil industry. The two have grown with each other, reinforcing and improving the position of each.

The discovery of oil in Texas is fraught with all the intrigue and excitement of gold in the West. At first, no one knew exactly what to do with the black stuff. There was a fair market in medicinal, lubricating, and illuminating products—but that was just about all. Then, as the Nineteenth Century turned into the Twentieth, the automobile came upon the scene—a mechanism with new and strange requirements. Oil and its associated products were one of those requirements. Thus with the introduction of the horseless carriage, the Oil Age was born.

Here the plot begins to thicken. These new-fangled contraptions which hissed and sputtered, frightened horses off the streets, and mussed a fine lady's hair, experienced extreme difficulty in negotiating the common buggy trail. Particularly in wet weather. Something better was needed. Operators of these benzine buggies finally concluded that a smooth surface was the *only* surface which offered acceptable motoring conditions.

The transition from buggy trails to highways—just as the nautical transition from sail to steam—was slow but determined. As more of these buggy trails were converted into suitable surfaces for automobiles, more automobiles came into use. As more automobiles came into use, more highways were needed. And so it goes—even today. More cars mean more highways, more highways mean greater travel by automobile, hence more cars in use, more highways needed. This cycle of modern transportation must have oil for fuel, lubrication, paving, maintenance, and for the manufacturing or refining of these products.

Just as any period of boom presents its strange and romantic tales of people and their dealings with new-found wealth, the story of oil discovery in Texas is not without its intriguing sidelights. Long before the days of the automobile and its fuel needs, the highways and their paving and maintenance needs, story and legend recount an industrious and imaginative folk and their application of the thick, black liquid.

Just outside Saratoga, Texas, on S. H. 770 southwest of Kountze, there is a marshy field. Looking closely through the swamp grass and undergrowth, you may see a short length of dark and slimy pipe protruding above the ground. Occasional sulfurous bubbles gurgle up through the algae-filled water standing in the pipe. This was once an oil well—one of the oldest in Texas. It was brought in quietly in the year 1865 with none of the excitement future gushers were to stir up. No millionaires were made as a result of it.

Before the Civil War, the site of present Saratoga was mostly dense wood, seldom visited by anyone except Indians. To the north lay the small settlement of Dollardsville, in

To look at, this would be hard to peg as the remains of an oil well. Hogs discovered the spot, and their owner, John Cotton, sank the well near Saratoga in Polk County.

Polk County. One of Dollardsville's citizens, a John Cotton, discovered one day that his stock of hogs had strayed from town. He immediately set out on horseback to search for the animals. As he rode deeper in the woods, evidence that his hogs had been there was all around. Low on the trunks of many trees, he saw marks where they had scratched their itching backs against the bark. But there was something peculiar here. The bark of the trees was black and greasy. Cotton soon discovered the reason—and his stray hogs. They were placidly basking and bathing in a natural spring of oil and black tar. Apparently the animals had found that by dunking themselves in the black liquid they could relieve the itching of lice and ticks on their backs.

Cotton commenced to gather his stock together, and while doing so was impressed with the quietness and solitude of this wood. Back in Dollardsville, his nearest neighbor was one-half mile away. And that, he considered, was encroaching entirely too much on a man's privacy. Upon returning to Dollardsville, he packed his family and belongings, moving the entire collection of children, clothes, furniture, wife, and animals to the Tar Hole.

Cotton was acquainted with the fact that petroleum had certain values as a lubricant, patent medicine, and fuel for lamps. In fact, in the *Dispensatory of the United States of America,* by Wood, published in 1858, a formula is given for controlling tapeworms—take one part petroleum with one and one-half parts tincture of asafetida, of which 40 drops are given three times a day.

In petroleum, Cotton saw the prospects of a fine business. So he started to sink a well with the assistance of Don Harpin and P. S. Watts. Two pine trees were converted into a derrick, held upright by guy wires. Drilling was begun using mules to raise a weight above the ground. The weight was dropped on a thick pipe, driving it into the ground. With this crude method, the partners sunk a well nearly 100 feet deep. Their resulting crude oil was then bottled and sent back East to be sold for patent medicine.

As if discovery and new blessings would never cease, the partners soon found the area to be abundant in mineral springs. Never men to pass up an opportunity, Cotton and his friends made plans to open a spa. It was soon obvious the venture would have commercial value. He named the little community after his hometown of Saratoga, New York. For a while, the enterprise flourished. By 1879, Cotton maintained several rent cabins for health seekers and a pavilion over the springs.

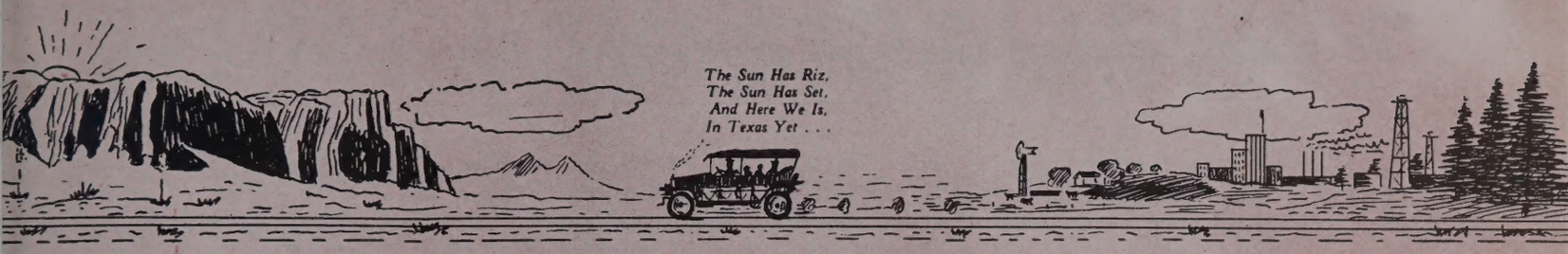
But oil was catching the fancy of a nation. It was being discovered everywhere. In 1903, the rising fever of the oil boom had lapsed into hysterical bedlam with the discovery of Spindletop. Wells were springing up all over East Texas. As a result, Cotton's mineral springs were soon spoiled.

Although Cotton had the gift of the opportunist, nevertheless he let pass by him a potentiality far greater than any of his other developments. While driving the well into the ground, natural gas began pouring from its mouth. As the weight struck the iron casing, sparks would occasionally fly from it, igniting the gas. Cotton would race into the house, fetch a bed quilt, wet it, and throw it over the flames. Several blankets later, Mrs. Cotton finally put her wifely foot down, requiring Mr. Cotton to search for other means of extinguishing the bothersome flame. Natural gas never impressed him with any feeling except contempt. Its appearance always meant a temporary halt to his drilling operations.

Today, the only relics of this crumbling page of Texas' oil story are a despondent-looking old house with a decaying flour barrel, and the rusty iron casing nearby, thick with the slime and algae of past years. That old pipe, sunk at the beginning of Texas' economic breath of life, has resisted every effort to saw it off.

With the discovery of oil and its attendant technological revolution, the tin lizzie *did* literally frighten horses off the streets. And they stayed off. Oil supplied the fuel to begin moving a nation's people. It was poured into their gas tanks and onto the highways over which they began riding. It now goes into asphaltic concrete, seal coat, air-entraining agents, and curing membranes to provide smooth and durable highway surfaces. Great highways would not be possible were not oil available to move the machines which build them. Without the black liquid which cured tapeworms and soothed the backs of Mr. Cotton's hogs, we could possibly be a nation on horseback and in buggies to this day.

As you streak down a multilane divided highway through great industry or rolling farm lands, the countryside tells a story if you search deep enough. That ancient pipe in a marshy swamp in Saratoga foretold one of Texas' greatest industries—oil—joined by one of the proudest of our state's possessions—Texas highways.



OVER THE HIGHWAYS

Comments . . . from the Traveling Public

I suppose it is normal for a human being to complain when something is wrong and omit praise when something is good. During the past years I have had occasions to travel a good deal over Texas and over the United States, Canada, and Mexico, and it has always been a relief to get back into the State of Texas because of the magnificent job that is done in providing state highways. I speak not only of the road surface which is well maintained, but also of the progress that you have made in providing road signs and grade crossings, and maintaining adequate shoulders. I never fail to be impressed with our system of roadside parks and the neatness and cleanness with which they are maintained. I notice also that you are locating these roadside parks at points of interest and considering the views of nature that can be obtained therefrom.

May I congratulate all who are responsible and express my personal appreciation as a taxpayer and a user of the Texas highway system.

Jerry Strickling
Houston, Texas

I returned from Gonzales to San Antonio by automobile Sunday morning at 1:30 A.M.

Along the way, it was impossible to not be impressed by the consideration to duty that the Highway Department has given the people of the State of Texas.

That I had no accident, I thank God and the Highway Department, especially the Maintenance Division.

Robert W. Lord
San Antonio, Texas

. . . I wish to extend my thanks for the tourist information you sent me. . . . I was able to plan a more enjoyable trip. . . .

However, I do have a few complaints. When I entered Texas the grass wasn't immediately at least six feet tall. The cattle weren't any bigger. . . .

I didn't succeed in locating any of those nine-foot Texans I have been hearing about. I couldn't hear a single Texan talking two miles away.

Neither were there any bank hold-ups, train robberies, stage stick-ups, cattle rustling, shoot outs in the street, nor even a single lynching. I didn't even see one steely jawed Ranger.

What's the matter with you boys? Why did you have to spoil all my tender illusions? Why, the first thing you know people will be saying you're civilized. Tsk! Tsk!

Edwin Sigler
Wichita, Kansas

I sincerely appreciate the excellent itinerary and maps that you sent me for my trip to Dallas, Texas, for attendance at the International City Manager's Association meeting.

It is very unusual for people of this day and time to make as much effort and show the courtesy that you have shown to me in the excellent job you have done in preparing the route brochure which you sent me.

If you ever have the opportunity to visit Virginia, I extend to you a most cordial invitation to visit our good city and more especially this office.

Lewis Z. Johnston Jr.
City Manager
Falls Church, Virginia

To and From Our Readers

I and several other Texans down under really enjoy reading your magazine. Keep up the good work.

Viggo Miller
30 Cloverdale Avenue
Toorak, Victoria
Australia

◈ *Viggo Miller worked in the Bridge Division, Austin office, before taking off for the other side of the world.*

◈ *We know that E. W. Mars, District Engineer at El Paso, reads part of our magazine, anyway. In November we carried a letter from a Mr. Howard wanting to know where he had bought some Indian Tears. A letter from Mars followed immediately containing the following:*

". . . For your information, the place in question is near Sierra Blanca and you can contact these people as follows:

Mrs. Dora Tankersley
P. O. Box 276
Sierra Blanca, Texas

I trust this is the information you desired."

When Ben Lednicky saw this sign, it reminded him of a cartoon used in TEXAS HIGHWAYS showing half a sign and the supervisor commenting, "Well, they cut my sign budget in half." They didn't go quite that far here, but maybe they did get their idea from Ken Collingsworth's cartoon.

About the Cover . . .

This sweeping arc of concrete is one deck of the Fort Worth four-level interchange. When we ran the story on this "pretzel" at the intersection of Interstate 20 and Interstate 35W in March of 1958, we had no pictures which showed how it came to be called mixmaster, or pretzel.

Now that we have some new pictures, we are giving you two views of the four-level structure. On the cover is an esthetic study of the interchange, and on the back is an aerial view of the pretzel. Any questions now as to how it got its nicknames?

TEXAS HIGHWAY COMMISSION

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D. C. GREER	**State Highway Engineer**

Texas Highways

TEXAS HIGHWAYS, official journal of the Texas Highway Department, is published in the interest of highway development in Texas and for departmental education in the improvement of construction, maintenance, and operation.

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HIGHWAY SIDELIGHTS

Gordon K. Shearer, Director of Research
Texas State Parks Board

Few of the many who visit the Mier heroes tomb in Monument Hill State Park know that Captain Ewen Cameron, intrepid leader of the Mier prisoners' escape, was a Texas cowboy.

Author Lewis Nordyke recently has been doing research into the personal lives of early Texas heroes. He disclosed Captain Cameron's ranch background in a talk to writers about the state's colorful heritage.

Captain Cameron is buried with the seventeen men who drew black beans in a death lottery to select decimation victims. Death of one in ten had been ordered for the recaptured prisoners. Captain Cameron drew a white bean in the death lottery. He was executed subsequently.

General Santa Anna ordered Captain Cameron's death, asserting that the shooting of 17 of the 176 escapees who were recaptured did not comply fully with the decimation order. Six is a major fraction of ten, Santa Anna said, and another life was forfeit. He designated Captain Cameron to be that one.

Also buried in the same tomb is Dr. Richard Fox Brenham who did not draw a black bean. Dr. Brenham had not lived to participate in the lottery. He had drawn the fire of Mexican guards to assist the escape of the others.

The inscription on the tomb, pictured above, gives only Captain Cameron's military status. The doughty cowboy-captain was a native of Scotland. He came to Victoria County, Texas, in 1837. The term "cowboy" was not then used generally, as it is today, to designate herders of cattle.

The park and tomb are on a bluff overlooking the Colorado River at La Grange on State Highway 71 and U.S. Highway 77.

CAPT. EWEN CAMERON
EXECUTED BY ORDER OF SANTA ANNA, APRIL 25, 1843
"COWARDS DIE MANY TIMES BEFORE THEIR DEATHS;
THE VALIANT NEVER TASTE OF DEATH BUT ONCE."
DR. RICHARD FOX BRENHAM
KILLED AT SALADO, MEXICO, FEB. 11, 1843

Fort Worth four-level interchange